The Bean Report

Your source for soybean and pulse crop agronomy and research.

Keeping the Soybean Honeymoon Alive – Part Two

Preventing Glyphosate Resistance

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GLYPHOSATE RESISTANT KOCHIA

has been confirmed in five Manitoba municipalities (Figure 1) – is yours one of them? Waterhemp is also a new weed in our province and is suspected to be glyphosate resistant. While herbicide resistance is not a new concept or problem, it seems that resistance to glyphosate attracts more attention and creates more urgency – likely due to its non-selective, *invincible* nature combined with its wide use and dependency. Either way, it's a problem that is here and will continue to spread unless we take action. We are told from industry that there is no new mode of action expected to be available for at least 10–15 years, so we need to preserve the tools we have. We've also always been told by weed biologists that it's

only a matter of time, and here it is. Glyphosate resistance earns a spot in this series discussing the issues we need to be aware of and prevent to keep the soybean honeymoon alive and well in Manitoba.
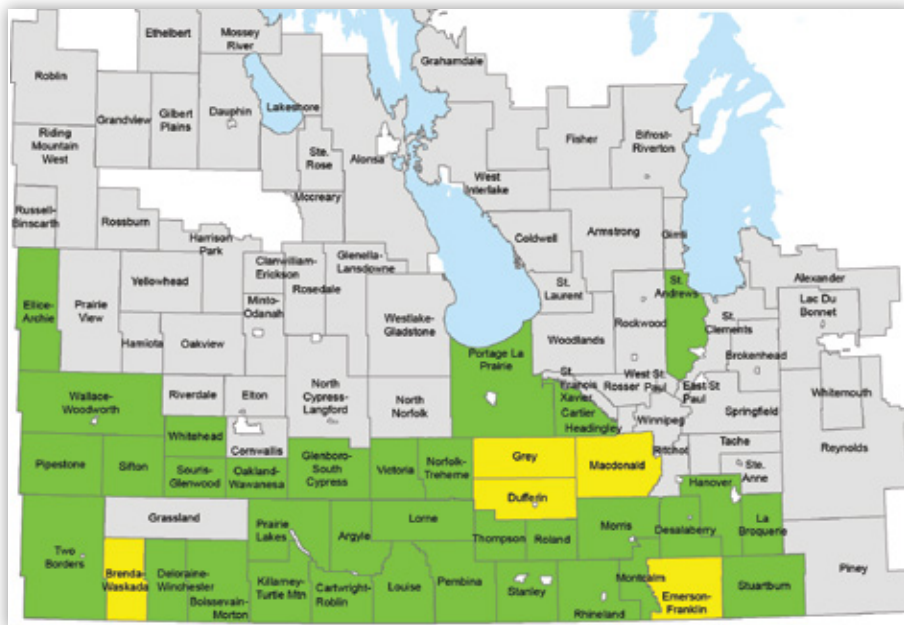
CURRENT SITUATION AND WHAT TO EXPECT

There are currently five glyphosate resistant (GR) weeds in North Dakota and Minnesota – giant ragweed, common ragweed, kochia, Canada fleabane and waterhemp. It only took seven years for these weeds to spread across two states (Figure 2). In Manitoba, the first confirmed case of GR kochia was in 2013 and a suspected case of GR waterhemp was detected in the Red River Valley in 2016. The

next four years will be critical for us to change our management practices and prevent the rapid spread seen down south. Flooding in the Red River Valley is a potential source of weed seed entry from the U.S. and farmers with adjacent cropland should scout carefully. Monitoring the situation in the U.S., surveying weed populations, knowledge of weed biology and current cropping practices can help predict what could be next. A prairie-wide weed survey in 2016 revealed the most common weeds found in Manitoba soybean fields (Table 1). When considering weed biology, relative abundance and cropping practices, weed scientists have listed wild oat, green foxtail and wild buckwheat to be the most likely to develop glyphosate resistance next, all of which are included in the top 10 most abundant weeds in Manitoba soybeans. Many farmers already manage group 1 resistant wild oats and group 2 resistant kochia – what if those weeds also became resistant to glyphosate?

HOW AT RISK IS YOUR FARM?

If you are reading this, I am assuming you grow Roundup Ready soybeans, corn and/or canola in rotation. Any farm that uses glyphosate or herbicides for that matter, has the potential for herbicide resistance to develop, but the level of risk can vary significantly depending on cropping practices. To gauge your level of risk, ask yourself the following questions:

- Do you grow Roundup Ready crops one in two years?
- Do you often apply glyphosate alone?
- Do you apply glyphosate multiple times per year?
- Have you noticed a shift in weed species on your farm?

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▼ *Figure 1. Glyphosate resistant kochia confirmed (yellow) and tested (green) throughout Manitoba (Source: Manitoba Agriculture)*

GLYSOPHATE-RESISTANT (GR) KOCHIA DISTRIBUTION (2016)

Table 1. Top 10 most common weeds found in soybean fields in 2016 (Source: AAFC and Manitoba Agriculture)

1	Canola/rapeseed
2	Wild buckwheat
3	Barnyard grass
4	Dandelion
5	Redroot pigweed
6	Spring wheat
7	Green foxtail
8	Yellow foxtail
9	Wild oats
10	Broad leaved plaintain

This self-assessment is critical to help you as farmers and agronomists understand the risk factors involved with development of GR, the more responses with "yes," the higher the risk for developing GR. The consequences of which can include increased herbicide costs, reduced yields, management complexity and limitations to the crops you can grow.

> **WEED RESISTANCE RISK ASSESSMENT**
> To complete the full risk assessment for weed resistance, visit **www.weedtool.com**

SOYBEAN PRODUCTION TIPS TO PREVENT GLYPHOSATE RESISTANCE

- **Don't just use glyphosate** – Investing in a pre-emergent herbicide, especially with residual activity, is a good option to manage early season weeds and take the pressure off the subsequent glyphosate application. Think about how often glyphosate applications are late due to wet conditions – if you include a pre-emerge, you can have more flexibility in the timing of the first glyphosate pass if there are weather delays. Several broadleaf herbicide options are available to tank-mix with glyphosate to reduce in-crop selection pressure.

- **Consider row spacing, seeding rate and fertility** – Risk of GR developing in soybeans is particularly high due

▼ *Figure 2. Spread of glyphosate resistant weeds in North Dakota and Minnesota from 2008 to 2013 (Source: NDSU)*

GLYSOPHATE-RESISTANT WEEDS IN NORTH DAKOTA AND MINNESOTA
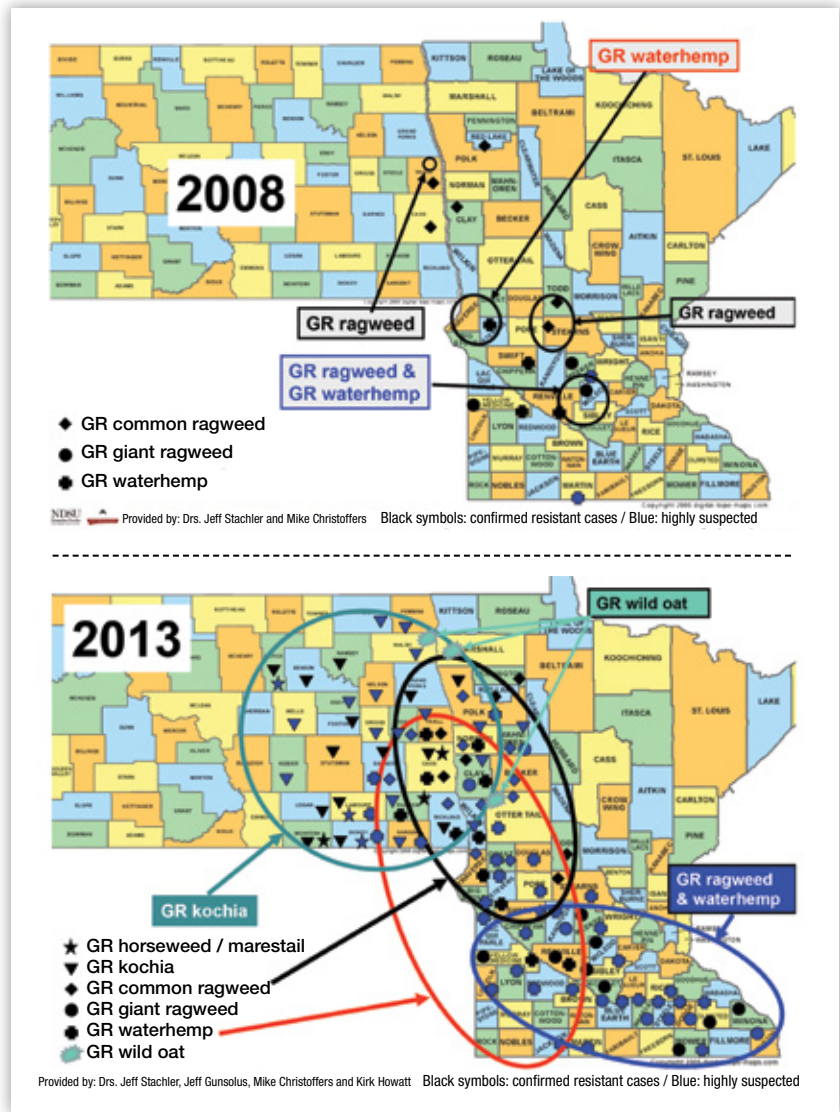
to their slow early season growth, which makes them poor competitors with weeds. Planting soybeans on narrow rows allows the canopy to close sooner, which is important for weed competition (better yield too). Planting at higher rates and low residual N can also reduce weed competition in some cases.

- **Diversity in rotation and herbicide systems** – Wheat, barley, oats, canola and forages are very competitive crops and they require different herbicides. All Manitoba crop rotations should include competitive crops and ideally,

a mixture of cereals, oilseeds and legumes. In my mind, crop diversity is the secret ingredient that western Canadian farmers have compared to our friends down south fighting major GR challenges. Like canola, we also have diversity in herbicide systems for soybeans which can be utilized – Roundup Ready (glyphosate tolerant), Extend (dicamba and glyphosate tolerant) and conventional or non-GM.

- **Practice zero tolerance** – If you notice weed escapes and suspect herbicide resistance; document the occurrence,

submit a sample to Pest Surveillance Lab in Winnipeg and develop a plan to prevent the weeds from setting seed. Zero tolerance also includes managing field borders, ditches and cleaning equipment.

- **Regular scouting and proper weed identification** – Knowledge of weed species, density and growth stage helps determine appropriate herbicide strategy and scouting after application allows for early detection of potentially resistant populations. Misidentification is commonly a problem for kochia vs. biennial wormwood vs. ragweed, green vs. yellow foxtail and redroot pigweed vs. waterhemp.
- **Develop a detailed integrated weed management strategy** – Based on your farming system and weed challenges develop a weed strategy that includes chemical, cultural and mechanical strategies for each weed and crop year (Table 2). ∎

Table 2. Weed management strategies for problem weeds and crop rotation

	Year 1 – Soybean	Year 2	Year 3	Year 4
Ex. Kochia (2, 9 resistant)	• Avoid problem fields or areas with salinity • PRE herbicide (14 or 3) • Narrow row spacing • Scout after herbicide application to assess efficacy • Utilize fall or spring seeded cover crop • Tillage or mowing • Extend soybeans – dicamba (4) + glyphosate (9)			
Ex. Wild oat				

EXAMPLE

Do you know about *The Bean Report* Scouting Network?

The Bean Report Scouting Network is a representative sample of farmers from across the province that allows MPSG's production specialist to survey their fields throughout the summer, as well as monitor crop conditions and pest pressure.

To join the network for 2017, contact Cassandra: **cassandra@manitobapulse.ca**